STATS 4CI3/6CI3 Winter 2021

ASSIGNMENT 2

Submit to Crowdmark using the link that was emailed to you.

Due before 11 PM on Friday, February 5th.

Your assignment must conform to the Assignment Standards listed below.

Assignments submitted up to 24 hours late will incur a 30% penalty. Assignments submitted more than 24 hours late will receive a zero grade.

Answer all questions, <u>stating your answer</u> and showing your code. Not all questions carry equal marks.

1. **(30 MARKS)** Set the seed to 1683 for all questions.

   (a) Using the runif() function in R, answer the following questions:

      i. generate 20 random numbers between the default values (0 and 1)

      ii. generate 50 random numbers between the 1 and 75

   (b) With regard to the Normal Distribution, answer the following questions:

      i. generate 30 random numbers from a normal distribution with mean 1 and standard deviation 2, and store in a vector "x"

      ii. generate CDF probabilities for the values in x

   (c) For a process that follows a Poisson distribution, generate a vector "y" of length 20 displaying the random number of events occuring when lambda (rate) equals 3.

2. **(20 MARKS)** Set the seed to 1683 for all questions.

   Using the sample() function in R, answer the following questions:

   (a) write code to roll 1 fair, six-sided die

   (b) write code to roll 5 fair, six-sided dice

   (c) write code to roll ten fair, six-sided dice and calculate their sum

3. **(25 MARKS)**

   Given that your random number generator produces a Uniform random variable "U", generate a random variable with the density $f(x) = 2.5x\sqrt{x}$ for $0 < x < 1$, using the inverse transformation method.

   Your answer should include all of the equations you used, as well as the R code that outputs your generated random variable.

Assignment Standards

- LaTeX is strongly recommended but not strictly required. The use of Markdown in R studio is also recommended.

- Submit your assignment as one **.pdf document**. **All R code should be included inline.**

- Do not include a title page. The title, your **name and student number** should be printed at the top of the first page.

- The writing and referencing should be appropriate to the university level.

- Various tools, including publicly available internet tools, may be used by the instructor to check the originality of submitted work.